

THE
PHYSIOLOGICAL LAWS
OF
HUMAN INCREASE.

BY
NATHAN ALLEN, M. D.,
OF LOWELL, MASS.

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THE PHYSIOLOGICAL LAWS OF HUMAN INCREASE.

THERE is no science whose history presents discoveries more brilliant or important than that of physiology. And though they have not been confined to any one period or nation, most of these discoveries have been made in the present century. While Hippocrates and Galen gained in their day great celebrity in this field of inquiry, physiology as a science may with propriety be said to have received its starting point only two centuries ago from that immortal discovery by Harvey of the circulation of the blood. Soon after this, the inductive principles of philosophy were introduced by Lord Bacon, when all vital phenomena were brought to the test of observation and experiment. Here, by applying the inductive method of investigation, Haller made greater advances in this science than any other individual, so much so that he has been termed the "Father of Modern Physiology."

But within the present century, by means of chemistry and the use of the microscope, with their appliances, still greater and more surprising advances have been made in a knowledge of physiology. In fact, the last forty or fifty years have witnessed here a continued series of new and valuable discoveries; and, while most of them have been applied with direct reference to improvement in medicine and the healing art, some have a far higher, broader, and more important bearing upon human welfare. This science unfolds not only the great laws of life and health, but involves principles that lie at the foundation of all true education, as well as of permanent improvement in civilization.

Judging from the past history of discoveries in this and kindred departments of inquiry, it is to be presumed there are still great truths and laws existing in physiology that have never yet been brought to light. Some of its most distinguished cultivators speak of the science as being yet in its infancy, and of "the rich

harvest which awaits the physiological laborer." Says one: "Certainly a well-arranged and most comprehensive science has already been reared, but it is destined to attain proportions much more gigantic than it now presents." If the theory of human increase about to be proposed is found to have a sure basis in the great laws of Physiology, it will be difficult to find language adequate to express the value of the principles involved, or the extent of their application. It approaches the subject from a point of view which has not hitherto been taken, and which opens a field of inquiry so new, so vast, and so complicated, that one almost shrinks from the undertaking. The most that any single individual can do in such a field, is to throw a mere pebble into the great ocean of truth.

In entering, therefore, upon an examination of this question, it becomes the inquirer to suspend his opinion till he can obtain a sufficient accumulation of facts and knowledge on the subject, so that he can form some rational and correct judgment as to their relative bearing, and the support they give to this or that theory. No prejudice or pre-conceived opinions should be allowed to stand in the way of coming to a fair and intelligent decision. But, in order to do this properly, some general knowledge—and the more profound the better—of the facts and laws of physiology is indispensable. Guided by the true Baconian spirit of philosophy, and after a thorough investigation of the whole subject, it may be expected we shall then arrive at some enlightened and satisfactory results in the extensive field of investigation.

The main reason why this most important subject—the law of human increase or of population—has not created more general interest, or found a more exact and uniform support is, that the true basis upon which the Creator placed it, has in a great measure been overlooked. It is a singular fact, that among all the writers on this subject there is scarcely one who has been thoroughly educated in the science of physiology, or in the practical application of medicine to the laws of life. The strictly inductive method by which the great principles of science are established has been but little employed. The attention of those who have made investigations and written most extensively upon this subject, has been turned in almost every other direction in quest of some cause, agency, or influence to explain changes in population, rather than of any primary fundamental law in human organization itself. But it stands to reason and common sense, that the

organs of the body, whose functions perform so important an agency in this matter, must be governed by some fixed laws as a part or condition of their creation. The existence of such laws is traceable throughout the works of the Creator, wherever science has pushed her researches, and especially in the animal and vegetable kingdoms. The human system cannot be made an exception to this universal principle. This law of propagation—the most important of all—must constitute a part of the nature of every organized body in its creation, though in its operations it may be affected by extraneous causes and influences. However powerful may be the effect of climate, food, and other external agents upon the application or working of this law, whether to impede, thwart, or in any way modify its operation, the law itself must exist in the body, and in a great measure control it. The truth of this fact is strikingly illustrated in the changes that have taken place in domestic animals. Within fifty years, or even twenty-five, what a wonderful improvement has been made, especially in the case of the horse, the cow, the sheep, etc. While external agents have had great influence in these changes, the most important agency of all—the leading factor employed—has been found to exist in the organization itself.

From the intimate analogy of law, as applied to animal and human physiology, and from the fact that physicians, as a class, spend most of their lives in the study of the body, it seems somewhat strange, at first, that their attention has never been turned more in this direction. But this ground has for a long time been pretty thoroughly occupied by writers upon population in attributing the causes or law of its increase to other sources than to the body. Besides, the attention of the medical profession, as far as turned in this particular direction, has been almost exclusively devoted to the reproductive organs—dwelling not so much upon their structure or functions in establishing any law, as upon certain normal or morbid conditions; whereas both the anatomy and physiology of these organs are very much dependent upon, as well as affected by, the development, health, and other conditions of all parts of the system. Another reason for this omission may have arisen from the fact, that the laws of hereditary descent, when considered in all their extent and effects, constitute a new chapter comparatively in physiology. If a thorough exposition of this particular department of the science in all its bearings could have been made, or attained, the idea would almost naturally have

been suggested, that there must be some general law covering all these influences.

With these preliminary remarks (and fully conscious of an inability to do the subject anything like justice), we propose here to submit the results of some study and observation in this field of research. They virtually involve a new theory of the increase of population, and are based strictly upon the laws of physiology. And who or what class of men are more competent to act as judges, and form rational opinions in such matters than members of the medical profession?

If the theory here proposed is false, let it be exposed; but if it is found to have a sure foundation in the laws of physiology, it is not only the privilege but the duty of this profession to take the lead in its discussion and its applications. As the field of research is almost boundless, including the history of mankind in its largest sense, our attention on the present occasion will be confined principally to the question in its connection with and bearings upon physiology. But in order to obtain a better understanding of the subject, it may be well first to notice briefly the existing theories upon population.

The theory oldest and best known is that of Malthus, which was brought first before the public as early as 1798, under the title of an "essay on the principle of population as it affects the future improvement of society." Its leading idea is that "population, when unchecked, increases in a geometrical ratio, while subsistence increases only in an arithmetical ratio." As population upon this hypothesis tended to increase much faster than subsistence, it became necessary to find causes for its prevention or destruction, so that these ratios might more nearly correspond. These causes he divides into two classes called "checks—the positive and the preventive." And among these checks he enumerates vice, poverty, famine, war, epidemics, earthquakes, etc. In none of his writings does Malthus make any reference whatever to physiology; as though it had no connection with the subject! But somehow strangely it has been found out, of late years, that at least one of his checks to population sustains a most intimate relation to this science.

The next distinct theory announced to the public was by Thomas Doubleday, in a work published in London, 1841, with this title: "The True Law of Population shown to be connected with the Food of the People." According to this theory the law

of population is connected with food in such a manner that there is a wonderful power inherent in nature to increase its fecundity or fertility whenever any species of genus is endangered. He discusses this provision of nature as applied to the animal and the vegetable kingdoms under two heads, the Plethoric and the Deplethoric States—the former as unfavorable, and the latter as favorable to fertility. As far as Doubleday explains and applies his theory, it is not only consistent with the great laws of physiology, but, when carried out to its fullest extent, it can receive a complete and satisfactory explanation only by the aid of physiology.

But probably the most popular theory, at the present day, is that of Herbert Spencer, first introduced to the public by an article in the *Westminster Review*, in 1852, styled a "New Theory of Population," deduced from the general law of animal fertility. His idea is, that an antagonism exists in nature between individualism and reproduction; that matter in its lower forms possesses a stronger power of increase than in all its higher forms; that the capacity of reproduction in animals is in an inverse ratio to their individuation, and that the ability to maintain individual life, and to multiply, varies also in the same manner. The views of Spencer, though expressed with great affluence of illustration, and complicated with many obscure points in philosophy, when reduced to the simple, practical tests of science, will be found to derive their support principally from the laws of animal physiology. Still no pretension is made that they are really based on this science. Other writers, as Saddler, Richards, Fourier, and several authors of works on Political Economy, have presented various views upon population, but no one, we believe, a complete and independent theory of itself.

During a long residence in a community whose population is mixed, our attention has been called to the great difference in the number of births between Irish, English, Scotch, and American women. A partial explanation was soon discovered, viz., that some portion of the latter used various means to prevent conception, and in case of pregnancy to procure abortion. But admitting that this practice was extensively carried on, there were multitudes of married women who never resorted to any such crime, so that this difference of birth-rate was not thus satisfactorily explained. Besides, upon an examination of the vital statistics of New England, it was found that fifty or one hundred

years ago, women generally here had large families, and that with this same people there had been a wonderful decrease in the birth-rate—so much so that it was becoming more and more a doubtful question, whether in point of numbers the stock was kept good.

Moreover, an investigation of the various changes that had taken place in the habits of women in respect to exercise, dress, education, etc., as well as in the state of society generally, suggested the inquiry, whether there might not have been certain causes in operation sufficiently potent to produce, in the course of two or three generations, some radical changes in the physical organization of woman? And, then, if any such change had taken place, the thought occurred that there might be some universal law in human organism itself, that governed the increase of the species. This led to an examination of works on population, as well as of medical writings treating of the physiology of the organs of reproduction. And the more extensively and thoroughly these investigations have been pursued, the more firm and conclusive have become our convictions that there exists a great general law of human increase, based upon physiology. But all we can do on the present occasion is, to notice briefly the nature and foundation of this law, together with an outline of some of the leading evidences in support of it. To expound it fully would require volumes, especially in all its diversified applications and bearings. If the principle here advocated is true, who can form any adequate conception what may be its beneficial results or bearings upon human welfare in all coming time?

In order to present a clear and correct view of this law, we will divide the body, for the sake of convenience, into four divisions or distinct compartments called temperaments. The *first* division the brain, the spinal column and nerves of motion and sensation scattered through the body, called *nervous temperament*.

Second. The heart, the lungs, and all the bloodvessels in the system, called the *sanguine temperament*.

Third. The organs in the abdomen, the stomach, bowels, liver, and absorbents, called the *bilious or lymphatic temperament*.

Fourth. The muscles, bones, ligaments, constituting the motive apparatus of the system, called the *muscular temperament*.

The term temperament, in one sense, denotes the result of a mixture or tempering of all the qualities, both physical and mental, of any individual; but as used here it is intended to ap-

ply more particularly to the different compartments of the body, as connected with health and the laws of human increase. As all the organs of the body are included in one or other of these temperaments, and as every organ, however insignificant or obscure, has a specific work to do in the animal economy, it is necessary that every one of these organs should have its *natural* development, and perform its *natural* functions.

The human body in its normal or most healthy state, may be compared to a perfect machine made up of a great variety of parts, each part performing its own work and not interfering with that of the others, so that the "wear and tear" will come upon all parts of the machinery alike. Every mechanic will say at once, that such a machine, thoroughly constructed and kept in running order, will accomplish for the time being far more work, and last much longer than one poorly built, not well-balanced in its parts, and continually getting out of order. This subject is beautifully illustrated in the teachings of the Apostle Paul, where he says: "The body is not one member, but many. * * * God hath set the members of every one of them in the body as it hath pleased him. * * * The eye cannot say unto the hand, I have no need of thee; nor again the head to the feet, I have no need of you. And whether one member suffer, all the members suffer with it, or one member be honored all the members rejoice with it." We are here taught, that if there is a seeming difference in the importance of the functions and relations of these members, they are all necessary in making up the whole body, and the rights of each must be respected.

And if this law is true when applied to individual members of the body, it must hold good with still greater force when applied to a whole class of organs included under the head of one of the temperaments. Here, at this point, do we begin to detect the mischief or trouble that, like a formidable parasite or a treacherous foe, has invaded and is sapping the human system. These temperaments are not equally developed; are not well-balanced; do not assist each other in their respective functions by doing severally their own proper work, but constantly interfere, thus violating the laws of nature. In carrying on the operations of the animal economy it is clearly the design of nature that there should be a perfect union or harmony of these temperaments; that such was the development of the human body at its creation, and that in such a state it is found most exempt from disease, is

eapable of performing the greatest amount of labor, of receiving the greatest amount of enjoyment, as well as reaching its greatest longevity.

Here, at this very point, springs the great law of human increase, viz., a complete development of all the organs in the body, thus constituting a perfect union or harmony between the temperaments. It presupposes that all other conditions are favorable, such as the age, the health, the union and adaptation of the married parties; that with this standard of organization, and provided the laws of nature are not violated or interfered with, there will uniformly be found not only the greatest number of children, but they will be endowed with the highest amount of physical vigor and health.

It is true, a great variety of conditions or powerful factors may enter largely into its operations and modify essentially its results, but, here in the peaceful organism of the human system, has this great law of population its germ, its seat and foundation. The common sense of mankind, which is applied to the practical duties of life, as well as to the numerous facts in science, would certainly incline us to believe that the body itself, in its various states and ever changing forms, must constitute the most prominent, if not the principal agency in the functions of increase. To establish a general law which is to have the greatest possible agency in developing the nature of a body, and controlling its very existence, the presumption is that such a law must be evolved, in some way, from the designs had in the creation of the body. Such has been found by experience and observation to be the fact, in reference to the great laws that pervade the whole animal and vegetable kingdoms. And though there may be objects and agencies extraneous to the body itself, that may have a powerful influence over its development, yet the most important law of all—the law that shapes its life, character, and destiny—must have its seat and foundation somewhere in the system itself. Such we should naturally suppose would be the fact in the case of man, the highest and the noblest work of the Creator, where human agency and accountability have their widest sweep. Whereas an examination into the views and theories of most writers upon population shows, that the laws which they lay down for its increase have been controlled, almost wholly, by agents or objects entirely external to the body, some of which hold only remote or indirect relations to it.

The theory, however, which we advocate has its base simply upon that organization of man which came perfect from the hands of his Maker, and was pronounced very good, and when man was commanded to "be fruitful and multiply and replenish the earth, and subdue it." But he, by his course of disobedience and rebellion, lost not only the moral image and likeness of his Creator, but that harmony and perfection in his physical organization, which he has never yet regained.

This same balance or union of the temperaments constitutes the standard for the greatest amount of health, of longevity and strength, that can ever be found in the human system. This is proved by the laws of physiology, as well as by facts gathered from experience, observation, and history. This same organization presents the only perfect standard of beauty for the human form; for there is such a standard founded in nature and represented in art, a perfect standard of beautiful figure for the eye, as well as of taste for the mind, when all its faculties are trained and cultivated to their highest degree. Accordingly whenever model specimens of the race have been presented for our consideration, they have always exhibited this harmonious development of the human body. The Apollo Belvidere and the Venus de Medici, the immortal works of the Greek chisel, represent well-balanced organizations, all parts of the system in beautiful symmetry, the vital organs large, the limbs, the muscles, the bones, the bloodvessels, the nerves, distinct and clearly defined; nothing too strong, nothing too weak, nothing in excess, nothing deficient. But notwithstanding such standards or models of human organization are set before us, the reality is nowhere to be found. No nation, or race or tribe, or people upon the globe can present perfect living examples, containing all the organs of the body in a perfectly healthy, well-balanced state. They can only offer approximations to this standard.

Now the human constitution as represented by these temperaments has been constantly varying in every age, and with all classes of people. The causes of these changes originate partly within the body, and partly from external agencies and influences. These temperaments often change materially, and sometimes radically, with the same individual between the cradle and the grave. Slight changes in the organism do not affect much the physical or mental character of an individual or people; but when a whole class of organs, or one of these temperaments becomes

very predominant, it has a most marked and sometimes serious effect.

We have dwelt somewhat at length upon the importance of this balance of organs, for it is the key not only to a sound constitution, perfect health, and long life, but to the law of increase. Nearly all the pains, diseases, and weaknesses of the body are but the result of deviations from this harmony; and an observance of the laws of life and health looks towards restoring this harmony. If, then, this balancing of all the organs in the body is essential to the greatest amount of health and longevity of the race, may it not become equally necessary for its increase? If only now and then a single individual in the community was found with a constitution badly diseased or imperfectly developed, its hereditary effects would not be very perceptible; but when large numbers or a majority are found so constituted, not more than one or two generations can possibly pass before such effects become marked and well known.

Before proceeding further in the discussion, it may be well to re-state, in as few words as possible, what this law is. IT IS BASED UPON A PERFECT DEVELOPMENT OF ALL THE ORGANS IN THE HUMAN BODY, SO THAT THERE SHALL BE A PERFECT HARMONY IN THE PERFORMANCE OF ALL THEIR RESPECTIVE FUNCTIONS. *It presupposes other conditions are favorable, such as the age, union, and adaptation of the married parties—provided no laws of nature are violated or interfered with—that there will uniformly be found with such a standard of organization, not only the greatest number of children, but they will be found endowed with the highest amount of physical vigor, strength, and health.*

The testimony of the medical profession, as far as expressed in this direction upon physiological points, is favorable, or at least is not opposed to the general principles involved in the theory here advocated. Hippocrates says: "The want of fruitfulness arises from sedentary life, indulgence in riding in carriages, want of exercise, profuseness in living, fatness, and muscular laxness, and weakness in the female sex." Dr. Short states that "the poorer and most laborious part of mankind are the fruitfulest;" and "the most voluptuous, idle, effeminate, and luxurious are the barrenest." Dr. Black says, "High refinement is an obstacle to propagation." Aristotle and Lord Bacon, though not strictly medical men, were remarkable for their knowledge of human nature. Says the former, "The condition most favorable to pro-

creation is a habit of body inured to labor." Says the latter, "reflection is an enemy to generation." Dean Swift remarks, with reference to the Irish, "low diet and moderate exercise are the best restorers of the breed." Alison, the historian, states that "the rate of increase of population is slowest in the most opulent classes." Testimonials similar to these could be obtained in great numbers from works on medicine and history; but facts and arguments gathered from the domain of medical science afford more positive evidence than any such references.

Arguments in support of this theory of increase may be deduced both directly and indirectly from the leading principles of physiology. One of these principles is, that every organ in the system, in order to secure its proper development, as well as perform its appropriate functions, must receive its due proportion of nutrition. Dr. Carpenter, in his work on physiology, makes this statement: "There is a certain antagonism between the nutritive and reproductive functions, the one being exercised at the expense of the other. The reproductive apparatus derives the materials of its operations through the nutritive system and its functions. If, therefore, it is in a state of excessive activity, it will necessarily draw off from the individual fabric some portion of the aliment destined for its maintenance. It may be universally observed, that when the nutritive functions are particularly active in supporting the individual, the reproductive system is undeveloped, and *vice versâ*."

Here is a powerful argument from the highest physiological authority; and the statement, so simple and plausible, must commend itself to the common sense and judgment of every person. Let any class of organs, or any parts of the body, be unduly or excessively exercised, and it requires the more nutriment to support them, thereby withdrawing what naturally should go to other organs. Let any one of the temperaments become too predominant and the others must suffer more or less. Let this be continued through two or three generations, and the evil becomes intensified.

The bearing of this principle upon the law of increase may be best illustrated by dividing the human race into three great classes, and tracing out the history of their comparative increase. Let us then, *first*, examine the class possessing organizations the most healthy and best balanced, in which the temperaments are nearest equally represented. According to the theory here pro-

posed, such a class, provided the laws of nature are not interfered with, will have the greatest number of children, combined with the highest degree of strength, vigor, and health. As representatives of this class may be mentioned the early settlers of New England; also the better portion of the Irish race, whether living in Ireland or America, together with a middling class of the German, the Scotch, and English, either living in Europe or in our own country. And sometimes where any two of these races are united, we find a very rapid multiplication of numbers, as for instance, among what are called the Scotch Irish or Canadian French.

While the birth-rate has been increasing in the newest portions of our country, it has decreased in others, especially in the oldest, and where there has been but little change in the population. But of one thing we are certain, in whatever part or place the birth-rate is greatest, there will be found a community having remarkably healthy and well-balanced physical organizations; and wherever we meet a married couple having a large family, such parents will invariably be found possessing constitutions excellent in health and stamina. In contrast with the foregoing class, let us turn to the two extremes in organization. In the *second* class, where either the muscular, lymphatic, or sanguine temperament greatly predominates, few or no children are found. Here the nutrition goes mainly to support the body of the individual, and the merely animal nature becomes excessive. Such examples are rare in a highly civilized state of society, but abound among a savage or a barbarous people. It has always been observed that excessively fleshy people are not very prolific; and nowhere in history do we meet with any account of a tribe or race, living in a purely savage, barbarous state, leading a low, coarse, sensual, animal life, that has been at all fruitful in children through several successive generations. The laws of nature have wisely fixed limitations to the *increase* as well as prosperity of such a people. Illustrations of this class may be found among some of the Indian tribes of our own country, also among the South Sea Islanders, as well as in certain portions of Africa.

The *third* class includes the other extreme in society, these having a great predominance of the nervous temperament. Here the brain and nervous system are in excess, accompanied with a deficiency of the muscular and vital temperaments. This class

is very numerous, and rapidly increasing under our present type of civilization. The brain and nervous system are exercised too much compared with other parts of the body, and require for their support an undue proportion of nutrition and blood. In this class may be found those devoted to literary and scientific pursuits, and who have become distinguished as writers, authors, poets, etc. etc. No facts in history are better known or established than that individuals celebrated for talent, genius, and mental attainments, and especially where both the married parties are thus distinguished, have few children; and such families in the course of two or three generations not unfrequently run out. The same principle holds good in cases where there is no distinction, provided both parties possess a great predominance of the nervous temperament. Examples of this class could be cited on a larger scale in the history of nations most highly civilized, and individual illustrations of such cases can be found in every community.

Again, the *laws of hereditary descent* afford positive evidence in favor of such a theory. In all works upon physiology and medicine, where the subject is referred to at all, the general principles of hereditary descent are admitted, and that the seeds or predisposition to certain diseases, such as scrofula, consumption, etc., are transmitted. But the proverb that "like begets like," has a more extended application than has generally been conceived. It does not refer merely to the size and form of the body, the features of the countenance, and the complexion of the skin, but involves the strength, the stamina of the constitution, and extends to the minutest parts of all the organs, whether external or internal. Such is the testimony of the highest medical authorities, and it can be confirmed by the experience and observation of any one who will take pains carefully to investigate the subject. If, then, there are fixed facts in the very nature of physical organization, which, by unchanging laws, descend from parent to child—the same evidence that proves this affords strong proof, that when all hereditary laws are summed up and carried back to their original—their starting point—they all tend toward establishing the truth of this great law of population. In fact they are a part and parcel of the same great law.

There is another class of facts, closely connected with the subject under consideration, that cannot be satisfactorily explained upon any other hypothesis. The sacred Scriptures clearly inti-

mate that there is something wrong in the intermarrying of blood relations, and by the law of Moses it was forbidden "within the third degree." Both the Greeks and Romans observed these facts, and proclaimed that such marriages were prejudicial to the healthy propagation of the species. The Catholic Church very early opposed it, and adopted a standing order or canon against all such alliances. A great number of facts have been gathered, both in Europe and our own country, which prove that such marriages beget not only a class of the worst diseases and complaints, such as scrofula, consumption, epilepsy, deafness, idiocy, deformities of the body, etc., but, in many cases, that they run out entirely in offspring within two or three generations. These facts have been accumulating for over four thousand years, and have never yet received any satisfactory solution. They would never have been noticed in the Scriptures, nor secured the attention they have, had they not indicated some fixed causes or laws existing in the constitution itself. It is admitted that there are exceptions in this intermarriage of relations, where no evil effects follow; but why these exceptions, or why bad effects follow at all, are questions not easily answered by any of the old theories of philosophy. There exists at the present day an honest difference of opinion on these points among the highest living authorities both in Europe and in our own country. Now all these conflicting views, we maintain, can be clearly and satisfactorily reconciled and explained by this law of increase, but cannot upon any other hypothesis.

Again, proof in support of this theory may be derived in a negative sense, from the physiology of "sterility," "barrenness," "impotence," etc. In all works treating of such cases, the causes are generally traceable to a defective, a feeble or diseased state of some parts of the body, or to an abuse of certain organs. The causes of such complaints are not often if ever found in a healthy, well-proportioned physical organism, where too the laws of life have always been properly observed. If the true law of increase is then based upon such a standard of physiology as is here indicated, not a single case of sterility, barrenness, or impotence could probably be found in a system thus constituted. In fact this same principle might be carried farther by showing that disease itself, of almost every kind and description, is a violator of this law. Of course diseases of different kinds, and especially of certain organs, would be found to vary in the extent of their

interference with the operation of this law. An argument of great power might be deduced from this source, in support of this theory of population; but the present occasion will not allow time for an examination into this particular field.

But there is a source, nearly allied in some respects to disease, from which strong evidence may be derived in favor of this theory of increase, viz., that all unnatural structures or abnormal conditions of the human body become less and less productive the farther we deviate from a perfect standard. A distinguished writer upon anthropology makes this curious remark: "As giants and dwarfs are rarely prolific, so men of prodigiously large or small intellectual powers may be expected to be deficient in fertility." Both these statements are undoubtedly true, and find a rational explanation by means of this law; but upon what other hypothesis can such phenomena be accounted for, or the following facts be explained. It is the opinion of some leading writers upon insanity that the insane, as a class, are not prolific, and if left to intermarry among themselves, they would soon run out. The same remark, we believe, will hold good when applied to the blind as a class; also, to the deaf and dumb, and the idiotic. There may be found among these classes cases where individual families are respectable in size, but they are exceptions to the general rule. All these classes, we believe, should they marry exclusively among themselves, if they did not run out in the course of a few generations, will not multiply to any great extent. It would seem as though infinite wisdom had devised in some way, that all such abnormal characters should not long, or upon a large scale, be propagated, but that they must, by the very conditions of their existence, tend to extinction.

Again, if this theory of increase is correct, it presents the only true physiological standard or normal state of woman best adapted for the propagation of the species. It furnishes a great general law or principle, extending to the various changes in the system occasioned by the state of pregnancy, and by means of which most valuable knowledge may be obtained, conducive to human improvement as well as the amelioration of suffering. In all the works of nature if we can have a true and correct standard set before us, or what is the highest development of the kind, it is found of immense advantage. It serves to throw sometimes a flood of light upon the numerous and complicated changes or deviations from this standard, affording in some cases a satisfac-

tory explanation of the symptoms or pathology, which in no other way could be obtained, and in other instances directing us to the best modes of relief. We assume here the fact, that married women, as a whole, have better health and live longer than those in single life, a fact admitted by medical writers generally, but more recently demonstrated by Dr. J. Stark, of Edinburgh, from the registration reports of Scotland. The organization of woman, the history of her diseases, and the rate of mortality prove the fact beyond controversy, that married life and the production of children are among the primary objects of her creation. Now it is to be presumed that there exists somewhere in physiology, in the very nature of things, a certain standard or type of organization best adapted for human increase, best for the mother herself as well as for her offspring. We believe that the perfectly healthy and well-balanced body already described, and upon which the law of population is based, can be proved by the principles of inductive science to be that standard. As this subject is so vast and complex it would require volumes for its complete exposition. All that we can here do is to select two or three points of observation.

First. Let us take all the married women whose organizations approximate nearest to this standard, and compare, carefully, the effects of pregnancy, including the accouchement and state of lactation, together with the character of their offspring as affected by the laws of hereditary descent.

Second. Let us take another class of women having an extreme development of a particular set of organs, or, in other words, a great predominance of one of the temperaments, and after analyzing and comparing the effects of pregnancy, etc., we shall find the results altogether in favor of the class first mentioned. Then there is a great number of women, possessing every grade, type, and character of organization intermediate between the two classes mentioned, and presenting an almost endless variety of phenomena arising from pregnancy. A careful and thorough analysis of these cases in all their different phases and bearings will show, we believe, that wherever these effects are most unfavorable to life and health, there the physical organism in some form varies essentially from the physiological standard here set before us. Moreover many anomalous cases which have seemed unaccountable in their symptoms, and have baffled all treatment,

will in this way find some explanation by means of this law or standard.

But there is another point of observation which is more tangible and conclusive in its evidence. If the conformation of woman were what it should be for the best propagation of the species, it presupposes her ability to furnish a suitable supply of wholesome nutriment for her offspring. This was the case with nearly all the first settlers in our country, and is very generally so now with the German, the English, the Scotch, and the Irish women. But what a contrast in this respect is presented by our native American women—especially in New England. It is thought by some very competent observers, that more than one half of our American women are obliged to resort to the bottle for nursing their offspring, and the number of this class is every year increasing. In most of these cases it is not a matter of choice, but of necessity. There is a great deficiency in the vital temperament; and the mammary glands are found very small, and in some instances almost entirely wanting. Besides, in all these cases the nervous temperament is altogether too predominant and too active, so much so as to require an undue proportion of the nutrition of the body. It is certain that the physical development of all these cases differs very materially from the physiological standard upon which the true law of increase is based. In confirmation of our statement respecting the large number of women unable to nurse their offspring, we here present the answer to an inquiry made of a manufacturer of a new and high-priced nursing bottle, who in such a matter was a most competent judge; his sales for the last year, he replied, amounted to "*five hundred gross.*" and in his judgment the sale of nursing bottles in the United States must amount yearly to not less than "*fifty thousand gross.*" What a contrast do these facts present in the sale and use of this article, as compared with the same fifty or one hundred years ago, when nursing bottles were but little known! Do not such facts argue some change not only in the disposition but in the physical organization of woman?

Connected with this part of the subject, there is another point of observation from which a most forcible argument may be deduced in favor of the theory of increase here advocated. In all medical works treating of nursing, and describing the particular qualities indispensable for a good wet-nurse, the description accords precisely with the physical development and organization

upon which the great physiological law of increase is based. We might here quote from different writers personal descriptions which would verify this statement, but it would occupy too much space. Such evidence is the more valuable for two reasons: 1st. The writers here referred to have given these descriptions from their own experience and observation, without any theory of their own or any design of contributing evidence to establish a general law or principle. 2d. These descriptions of a good nurse come from a large number of medical writers, and what is particularly noteworthy there is a remarkable agreement or uniformity in their statements. The natural inference from these facts is, that the organization which is found best fitted or adapted to afford proper nutriment to an infant must be the best for its production, or, in other words, must be regarded as the physiological standard upon which is engrafted this great law of increase.

At the same time, on the other hand, the admission of the correctness of the theory will help to explain the anomalous position of all those mothers who cannot nurse their children at all, or can only furnish a partial supply of nourishment; and without some such law as a guiding principle, it becomes very difficult, if not impossible, to explain satisfactorily all cases of this character. And with a complete knowledge of this law, what a great advantage is obtained in the selection or treatment of a nurse.

Again, there is another quarter from whence strong arguments may be deduced in favor of this theory; that is from *analogy*.

1st. *From analogy as applied to the human system.*—It is admitted, we believe, by the highest authorities in physiology, that the brain is not only the organ of the mind as a whole, but that different portions of it sustain a direct relation to certain mental manifestations—for instance, that the functions of the anterior lobe of the brain are connected with the intellect, those of the upper or coronal region with the moral sentiment, and those of the lower and posterior portions with the animal propensities. Hence, the greater relatively is the development of any one of these parts of the brain, the stronger in the individual will be the manifestation of intellect or moral sense or animal propensity. It is well known that some writers upon the functions of the brain go much farther in their divisions of it, making every convolution the organ of a distinct faculty of the mind; but while the admission of the truth of this last view of its functions is not

necessary at all for our present argument, it adds very much to its force and beauty.

Now in order to secure physiologically the highest type of man, as well also as the most perfect character in life, there must be, in the very nature of things, a full and equal development of all parts of the brain, constituting a perfect harmony or balance of organization throughout. It has long been a theory with some writers upon mental philosophy that, in order to secure the greatest amount of happiness, as well also as accomplish most in life, the animal nature should be subject to the intellect, and both these should be under the control of the moral sentiments; or, in other words, that while every faculty of the mind should be exercised and gratified in accordance with its own nature, it must be done in such a manner that there will be perfect harmony or agreement of all the faculties in this exercise and gratification. With writers who base their views of mental science upon the functions of the brain, this is not mere theory, but matter of demonstration. It is one of the pillars or cardinal points of their philosophy. But, in order to effect this, the more the brain approximates towards a perfect standard in every part of its development, the more perfect will be this harmony or union in the gratification of all the mental faculties. In this well-balanced and equally developed brain, as a standard for the highest mental manifestations, we have a model corresponding in some respects to the physiological conformation of the body described in this paper, and which constitutes the basis or groundwork for the law of population. But this is not the only resemblance. There exists an intimate and fixed relation between the developments of portions of the brain and certain parts of the body. With a very large anterior lobe of the brain we generally find a marked nervous temperament; and, on the other hand, where the lower and back parts of the brain are largely developed, we have a predominance of the lymphatic and sanguine temperaments. Thus, upon certain physical conditions of the body may be predicated corresponding developments of the brain and character. When it is considered what are the particular functions of the anterior and posterior portions of the brain, and then what effects or relations an undue development of certain organs of the body have upon the theory of human increase, it will be seen at once that there is a surprising analogy between these two classes of

facts; an analogy which furnishes an argument of no small force in connection with others.

Second point from analogy.—Facts and arguments of the most convincing nature can be adduced in favor of this theory of population from the vegetable and animal kingdoms. The same general laws that govern all organic matter in these lower orders govern and control all the changes that take place in the human system. It is true, there may be some points of variance and some modifications that are not strictly analogous; but, in the main, the general principles operating in these several departments are the same. The wonderful improvements and changes that have been brought about within a few years in domestic animals have all been effected by the application of laws similar to what prevail in human physiology. We cannot enter here into detailed points of proof, but confidently assert that, by a careful comparison and analysis, the law of increase here advocated will throw a flood of light upon certain parts of vegetable physiology; while, on the other hand, facts deduced from these two departments of science afford the strongest positive evidence in proof of this same law of human increase. For instance, it explains at once the philosophy of that whole subject, the “system of cross-breeding,” which, from an almost endless series of experiments, has resulted in a most surprising improvement of domestic stock, and it will settle the controverted points in that vexed question of “in-and-in breeding,” upon which there has been so much discussion and difference of opinion.

Third argument from analogy.—All the primary laws of nature or great general principles must have their origin or basis in a perfectly healthy structure or normal state of things. Just as soon as we deviate from this starting point, arise secondary causes and their effects, and the farther we go the greater the number and variety of these causes. This fact holds true, especially whenever vital or organic laws are concerned. For illustration, in the vegetable or animal kingdom, where these laws have long been violated, where many changes have occurred, and a multitude of secondary causes and agencies have been operating, no great law or principle can be established. Organization here, compared with its primary and highest development, has become disordered or abnormal. Here is a radical defect in the views of most writers on population. Their theories and arguments are based, in a great measure, upon nature

in a morbid or deranged state. One resorts to war, famine, pestilence, earthquakes, etc., as chief agents in regulating or adjusting his theory. Another bases his law upon nature in a plethoric or deplethoric state; in other words, a morbid, unhealthy state. And another maintains, as a foundation for his theory, that there exists an antagonism in nature itself between individualism and reproduction. It is true that facts and arguments may be brought from these sources to aid in illustrating and proving a general law; but its germ, its starting point and fountain head must rest upon a normal healthy structure. Thus the great laws of life and health, among which that of increase is the most important, must be grounded upon physiology in its perfect state, and not upon its pathology, or an organization that is deranged, diseased, and altogether abnormal in condition.

In reasoning "from effect to cause" and "from cause to effect," there is great danger of stopping at the immediate cause of the phenomena we are investigating. This course of reasoning is very common, and may answer to secure certain objects on a small scale, or where nature is in a disordered state, but no universal principle, like the law of population, can thus be established. Here the relations of cause and effect must be reduced or traced into a system of principles, and then these principles must be made to harmonize with all other demonstrable truths in science, and lastly, the whole must be traced back to some law of nature as a first premise or fundamental basis. The more thoroughly the theory of increase here advocated is tested by such a course of reasoning or by the inductive principles of science, the more satisfactory and unquestioned will be the result, viz., that it has a sure foundation in nature and must be classed among the primary laws of human existence.

There are two points, it is thought, secured by the views here presented which are deserving a more careful consideration, especially as compared with other theories. In a law of population where the agency of man is so much concerned, the highest dictates of wisdom would teach us to expect, that while he ought to act perfectly free and voluntarily, he should also be governed by high motives of improvement and a regard for the increase of human happiness. If man is created a free moral agent, accountable for all his acts, the law providing for the propagation of the species should certainly be of such a character that he can clearly understand its nature and sanctions—a law which he

can and should obey under the highest possible motives. In fact he should be made to realize fully that nowhere in this world is human agency more free and important or where the issues are so momentous, and that though all the changes taking place in physical organization as connected with the propagation of the race are the results of fixed laws, still he has a most important agency in as well as control over them. Let the theories of Malthus, of Doubleday, of Spencer, and even of Darwin, be subjected to this test, and where do they place human agency and motive? Do they not represent man as passive, in a great measure, and that the increase and changes of population are mainly beyond his power and control? As compared with these theories what a contrast does the law of human increase based upon physiology present!

Then as to the motive or encouragement held out for permanently improving and elevating the race, how do these different theories stand? In a great question involving so directly the condition, character, and destiny of a people as that of propagation, we should naturally expect that a law regulating its increase would hold out to its agents or actors powerful motives for improvement, and that with the use of certain means or agencies there should be a moral certainty that corresponding results would follow. Especially should this be the case where there was a constant advance of knowledge and improvement in many departments of society as well as in the elements of the highest civilization. Motives for improvement in producing the material for a better and higher order of being should be so incorporated into and connected with the laws of propagation that every individual and every generation should act rationally in the matter, and see in prospect the fruits of their own labors. Now, let a careful analysis be made of the prevailing theories on population, and we shall find but little connection between the motive and any certain visible results. But how different the theory or law of increase based upon physiology! Here the way is clearly made known and the agencies or conditions are distinctly pointed out in the proper qualities and adaptation of the married parties, as well as in the laws of hereditary descent. This theory explains not only the *rationale* or how changes in the physical system are affected, but by what agencies continued through several generations most surprising improvements could be made in elevating, ennobling, and perfecting human character. Here we have in this

law combined free agency, moral certainty of action, and the highest possible order of motives.

The question may be asked, why has not this law, so important, been discovered before? In reply, it may be briefly said, first, that nearly all writers upon this subject have been looking to other sources than the *body itself* for a foundation of this law; and, secondly, the attention of the medical profession—as far as turned in this direction—has been devoted almost exclusively to the reproductive organs—dwelling not so much upon their structure or general functions, as upon certain normal or morbid conditions, and without considering properly the relations which these organs sustain to the whole body—or, in other words, that both their anatomy and physiology depend very much upon the development and other conditions of all parts of the system.

Moreover, it seems to have been the design of Providence that the great truths of nature should be slowly brought to light at different periods, and sometimes in a very incidental manner, as well as by humble agencies. The laws of gravitation were the same, and similar phenomena had been witnessed by multitudes long before Newton, from the falling of an apple, caught the idea that there was some peculiar or occult power indicated by that trivial occurrence. The heart had been repeatedly examined by anatomists, its structure and functions had been carefully studied by large numbers of physicians, before Harvey discovered the circulation of the blood. So the morbid structure and the functions of the lungs had been made a study by many medical men long before Laennec discovered, by auscultation and percussion, that the physical outward signs could give such a wonderful insight into the pathology of this organ. All great truths, when once discovered, are very simple, and the surprise to all is that they were not generally known before.

If the theory here advanced is the true law of human increase or population, it is not a mere theory or an abstract general principle, but it is capable of almost endless applications; for instance, in affording us a better knowledge of the nature of man—his duties and responsibilities in relation to himself, to the family, to society, and to his Maker; in furnishing a guide, or great principle, by which certain practices and fashions in society, certain modes of education, systems of morals, legislation, etc., can be tested; in showing the importance and sacredness of the laws of

life and health, that they are a part of the will and government of God in this world, as much as His revealed commands.

And to no class of persons can it prove of so much interest and value as to medical men. It affords a new stand-point in physiology from which to study the relations of the body as a whole, and especially in their connection with the reproductive organs. It presents a new, instructive, and most important guide with reference to female organization, as to what is its highest normal condition, or the standard best adapted for the propagation of the species. It will shed new light upon many of the changes occasioned by pregnancy, which have hitherto been found difficult of explanation, and will furnish a better knowledge of the relations existing between the mother and the infant by way of hereditary tendencies, as well as in the matter of nutrition. It not only explains in a clearer light than ever the laws of hereditary descent, but magnifies their importance in relation to human progress and welfare. And as it shows that these laws depend upon or are connected with a just and perfect development of all the parts of the human frame, and a nice adjustment or correlation of each to all, it imparts to the latter a new importance, and demands a higher regard and a more careful treatment, if we would secure success to our systems of education, and permanence to the forms of æsthetic culture and religious faith, by which our times are distinguished and ennobled. In fact it exalts the human body to a much higher position than has hitherto been entertained, by demonstrating that true education, all genuine civilization, and pure Christianity, in order to have a permanent basis and progress, must have their foundation and support in the laws of the physical system far more than what has generally been admitted. And who are to be the interpreters, the expounders of these laws, unless the members of the medical profession? Does it not impose upon them new duties, and higher responsibilities in their relations to the public? As the views here presented show more than ever the vast importance of physical laws, it certainly behooves those whose chief studies are so directly connected with these laws as physicians, to take the lead in their discussion and application. And if found adequate to the task in this new field of research, will they not also more than ever prove themselves the guardians of public health, the almoners of human welfare, as well as benefactors of the race? In great emergencies,

when by epidemics, by sudden catastrophies, and by desolating wars, the lives of multitudes have been destroyed or perilled by disease, by wounds, and by injuries innumerable, the services of skilful physicians have been found of the greatest value; but here is an emergency, a field of labor involving for all time the highest interests of the whole race, which medical men, of all others, should occupy, and by which they may make their influence felt through all coming generations.

